

## Claims

- [1] A system for tracking position of a mobile unit in a mobile communication system, comprising
- a plurality of beacons installed within a cell coverage of a base station, each beacon having its sub-coverage and transmitting a pilot signal to the mobile unit in the sub-coverage;
- a base station controller for checking whether beacon information is included in a Pilot Strength Measurement Message (PSMM) signal upon receiving the PSMM signal from the mobile unit via a base transceiver station, the base station controller transmitting position information including the beacon information if the beacon information is included in the PSMM signal, the base station controller transmitting neighbor list information on base transceiver stations adjacent to the mobile unit if the beacon information is not included in the PSMM signal; and
- a position-tracking device for extracting information on the corresponding beacon from its database by using the position information upon receiving the position information including the beacon information from the base station controller, the position-tracking device further tracking/determining the position of the mobile unit by using the information on the corresponding beacon, or for tracking/determining position of the mobile unit by a conventional position-tracking method by using the neighbor list information on the adjacent base transceiver stations upon receiving the neighbor list information on the base transceiver stations adjacent to the mobile unit from the base station controller.
- [2] The system of claim 1, wherein the radius of the sub-coverage of the beacon ranges from about 5 m to about 300 m.
- [3] The system of claim 1, wherein the position information transmitted from the base station controller to the position-tracking device includes pilot number (PN) information of the corresponding beacon, delay information representing a distance from the center of the corresponding beacon to the mobile unit, and time stamp information representing measurement time of the mobile unit.
- [4] The system of claim 1, wherein the information on the corresponding beacon which is extracted from the database of the position-tracking device includes latitude, longitude, coverage radius of the corresponding beacon and other information on environments of the corresponding beacon.

- [5] The system of claim 1, wherein each beacon has the same radius of coverage and a plurality of the beacons are installed uniformly to cover the whole area of the cell coverage of a particular base station.
- [6] The system of claim 1, wherein each beacon has different radius of coverage and a plurality of the beacons are installed at only particular regions within cell coverage of a particular base station to cover only the particular regions.
- [7] The system of claim 1, wherein a plurality of the beacons are installed so that virtual PN is provided toward inside the border of the cell coverage of a particular base station at regions within the cell-coverage of the particular base station where only one pilot signal is sensed.
- [8] The system of claim 1, wherein each beacon has the same radius of coverage and a plurality of the beacons are installed so that virtual PN is provided to a cell coverage of a particular base station and to a cell coverage of adjacent base stations at regions within the cell-coverage of the particular base station where only one pilot signal is sensed.
- [9] A method for tracking position of a mobile unit in a communication system including the mobile unit, beacons, a base station controller and a position-tracking device, the method comprising:  
checking whether beacon information is included in a Pilot Strength Measurement Message (PSMM) signal when the base station controller receives the PSMM signal from the mobile unit;  
transmitting position information including the beacon information from the base station controller to the position-tracking device if the PSMM signal from the mobile unit contains the beacon information; and  
extracting information on the corresponding beacon from the database of the position-tracking device when the position-tracking device receives the position information including the beacon information from the base station controller, and tracking/determining the position of the mobile unit using the information on the corresponding beacon.
- [10] The method of claim 9, further comprising  
transmitting neighbor list information on the base transceiver stations adjacent to the mobile unit to the position-tracking device if the PSMM signal received from the mobile unit does not contain the beacon information,  
tracking/determining the position of the mobile unit by a conventional position-tracking method through using the neighbor list information when the position-

tracking device receives the neighbor list information from the base station controller.

- [11] The method of claim 9, wherein the position information including the beacon information, which the base station controller transmits to the position-tracking system, includes pilot number (PN) information of the corresponding beacon, delay information representing a distance from the center of the corresponding beacon to the mobile unit, and time stamp information representing measurement time of the mobile unit.
- [12] The method of claim 9, wherein the information on the corresponding beacon, which is extracted from the database of the position-tracking device includes latitude, longitude, coverage radius of the corresponding beacon and other information on environments of the corresponding beacon.
- [13] The method of claim 9, wherein the tracked information on the position of the mobile unit is employed in the location-based supplemental service of the mobile communication system.